FIG. 1

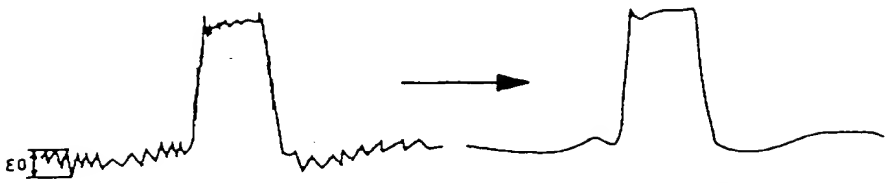

FIG. 2

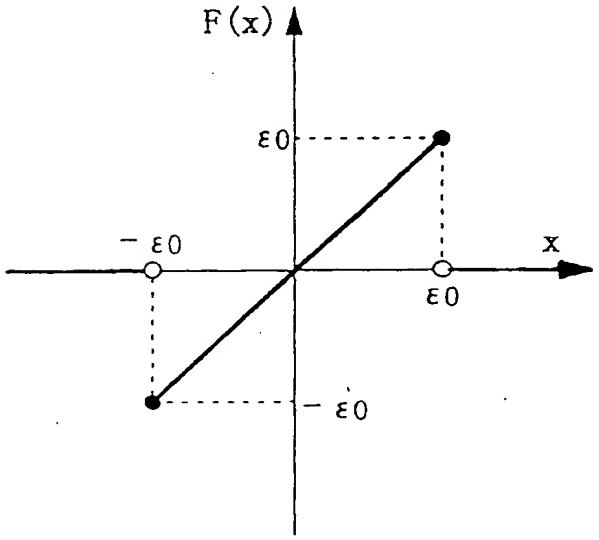

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FIG. 3

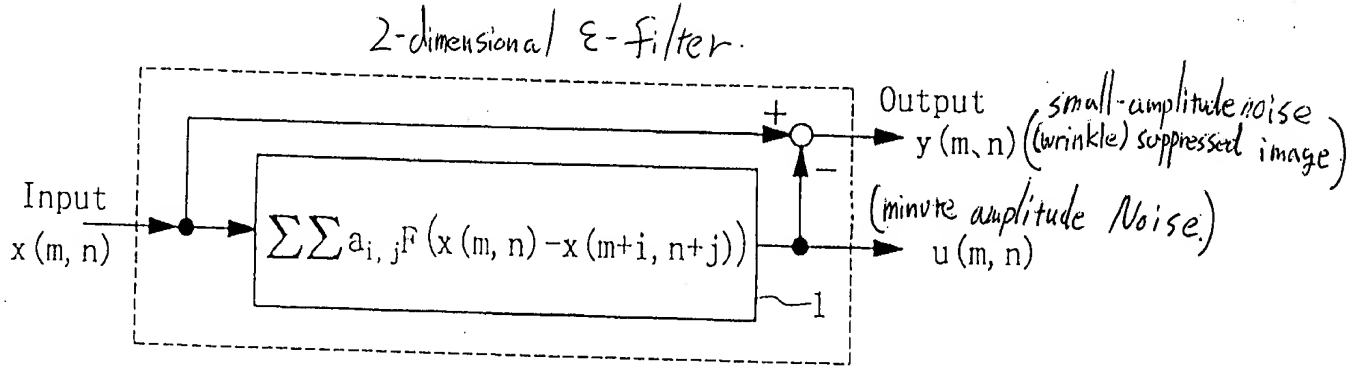
2-dimensional ε-filter.
Input
x (m, n)
$\sum\sum a_{i,j} F(x(m,n) - x(m+i, n+j))$
1
+
−
Output
y (m, n)
(small-amplitude noise (wrinkle) suppressed image)
(minute amplitude Noise)
u (m, n)

FIG. 1

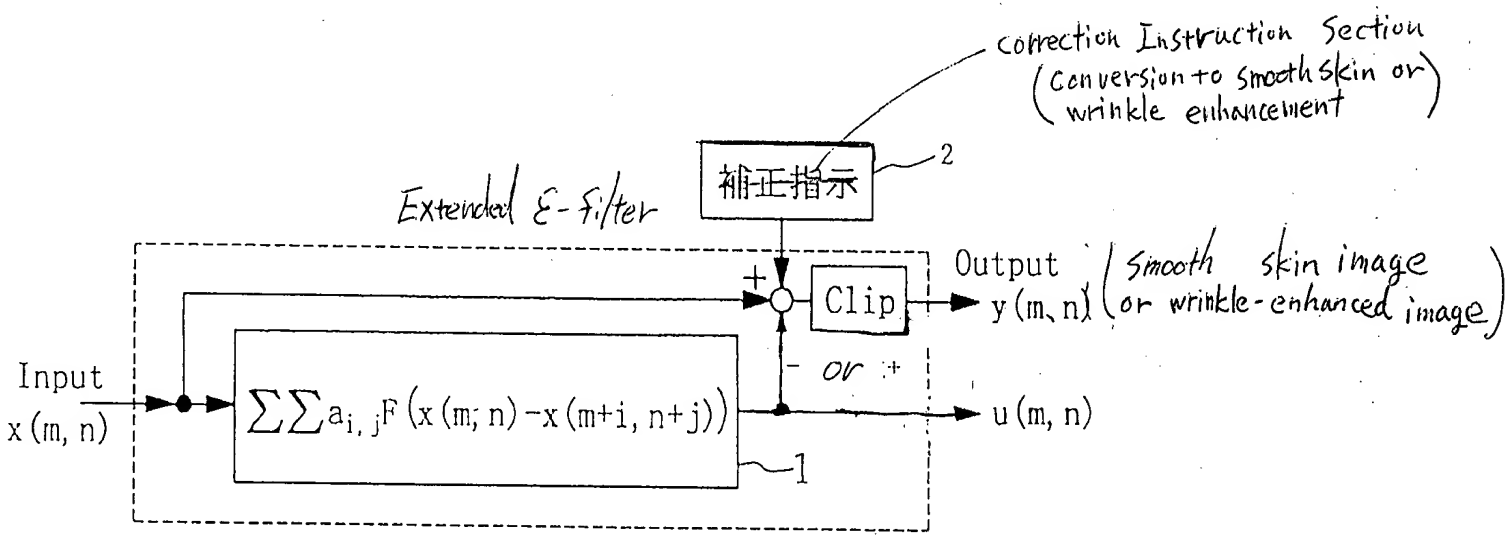
correction Instruction Section
(conversion to smooth skin or wrinkle enhancement)
補正指示
2
Extended ε-filter
Output
y(m, n)
(smooth skin image or wrinkle-enhanced image)
Clip
+
- or +
Input
x(m, n)
$\sum\sum a_{i,j} F(x(m;n)-x(m+i,n+j))$
1
u(m, n)

FIG. 5

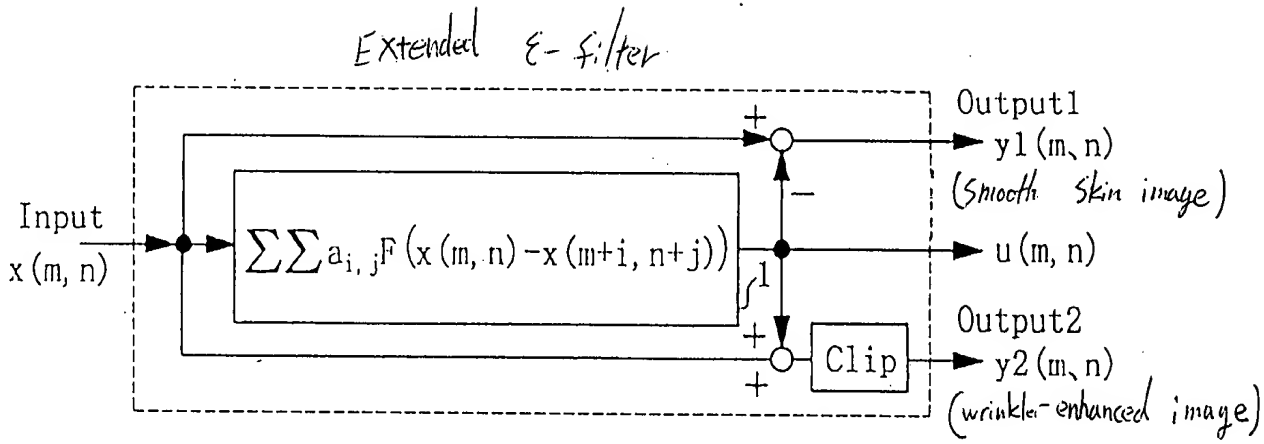
Extended ε-filter
Input
x(m, n)
ΣΣ a_{i,j} F(x(m, n) − x(m+i, n+j))
1
Clip
+
+
+
−
Output1
y1(m, n)
(Smooth skin image)
u(m, n)
Output2
y2(m, n)
(wrinkle-enhanced image)

FIG. 6

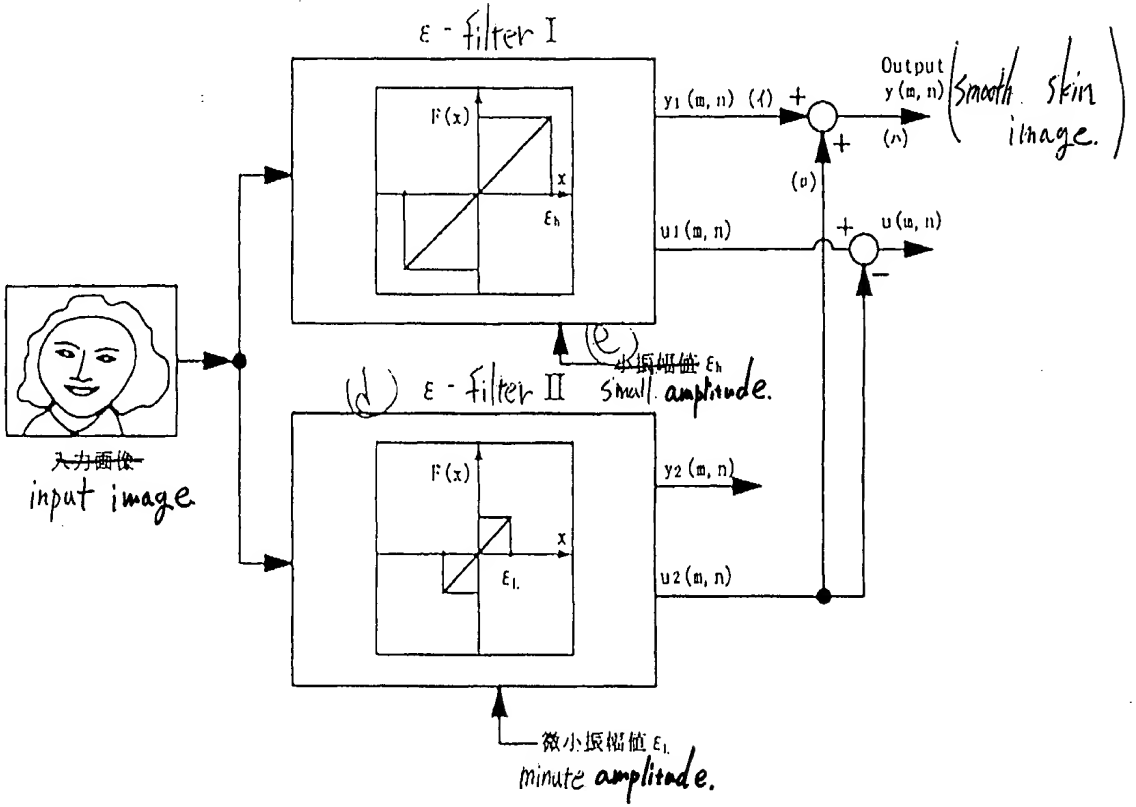
ε - filter I
F(x)
x
εh
y1 (m, n) (イ)
Output
y (m, n)
(ハ)
(ロ)
u1 (m, n)
u (m, n)
(ニ) 小振幅値 εh
small amplitude.
(ハ) ε - filter II
F(x)
x
εl
y2 (m, n)
u2 (m, n)
微小振幅値 εl
minute amplitude.
入力画像
input image
Smooth skin image.

FIG. 7

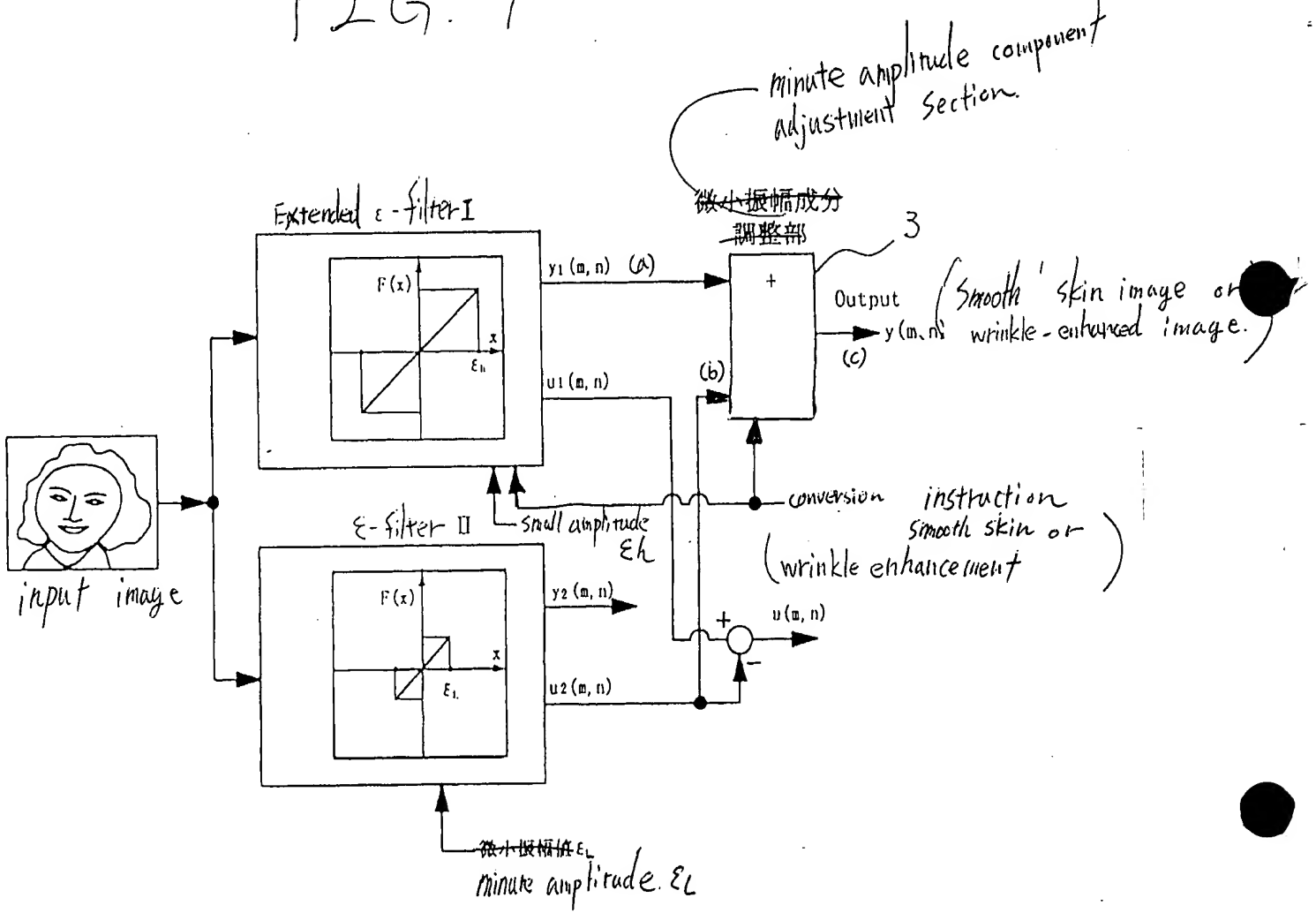
minute amplitude component adjustment section
微小振幅成分調整部
3
Extended ε-filter I
F(x)
x
εh
y1(m, n) (a)
u1(m, n)
+
Output
y(m, n)
(c)
(b)
('Smooth' skin image or wrinkle-enhanced image.)
input image
ε-filter II
small amplitude εh
conversion instruction
(smooth skin or wrinkle enhancement)
F(x)
x
εL
y2(m, n)
u2(m, n)
+
−
v(m, n)
微小振幅値εL
minute amplitude εL

FIG. 8

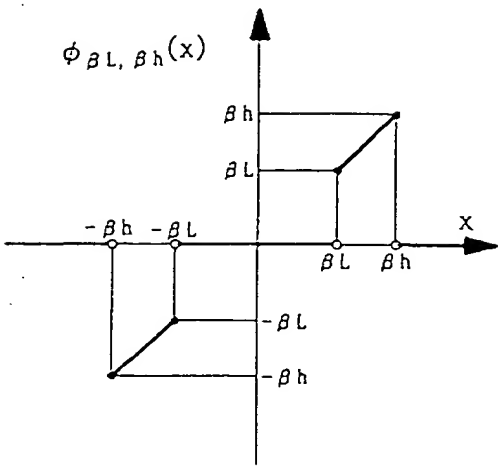

FIG. 9

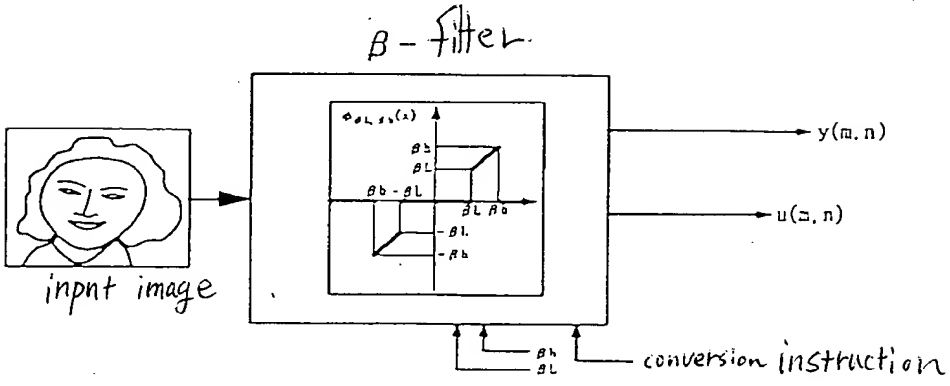

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FIG. 10

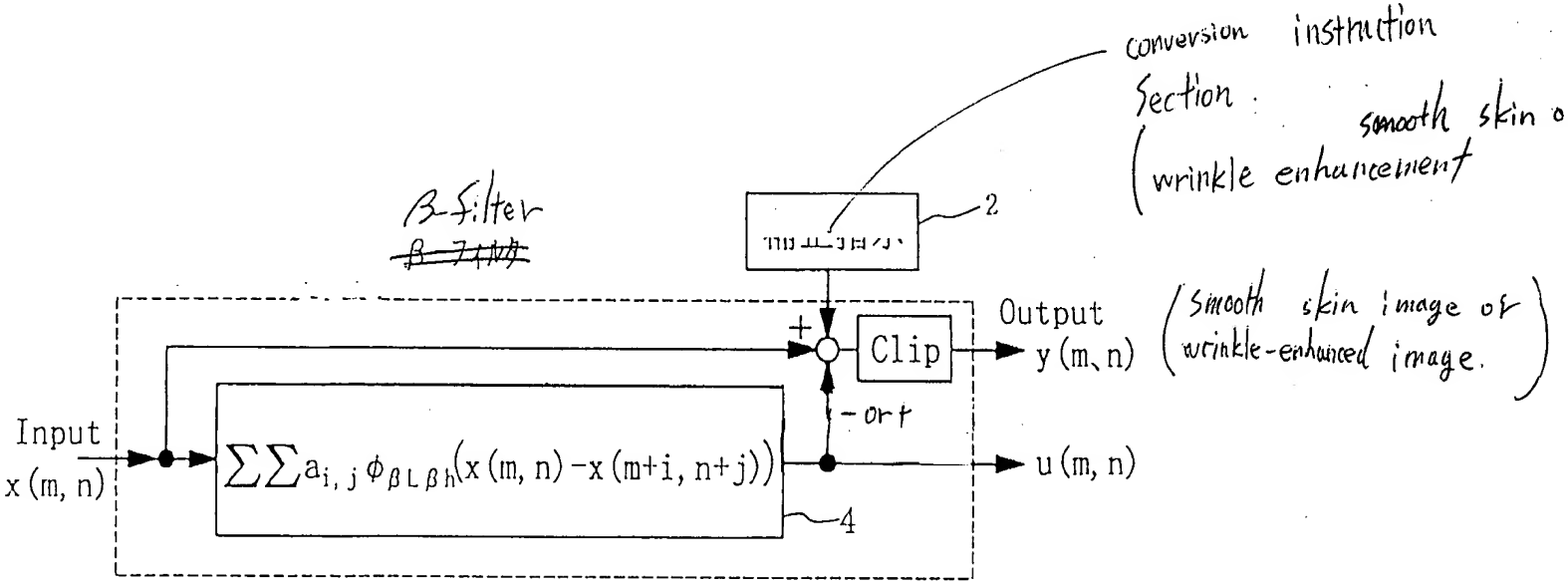
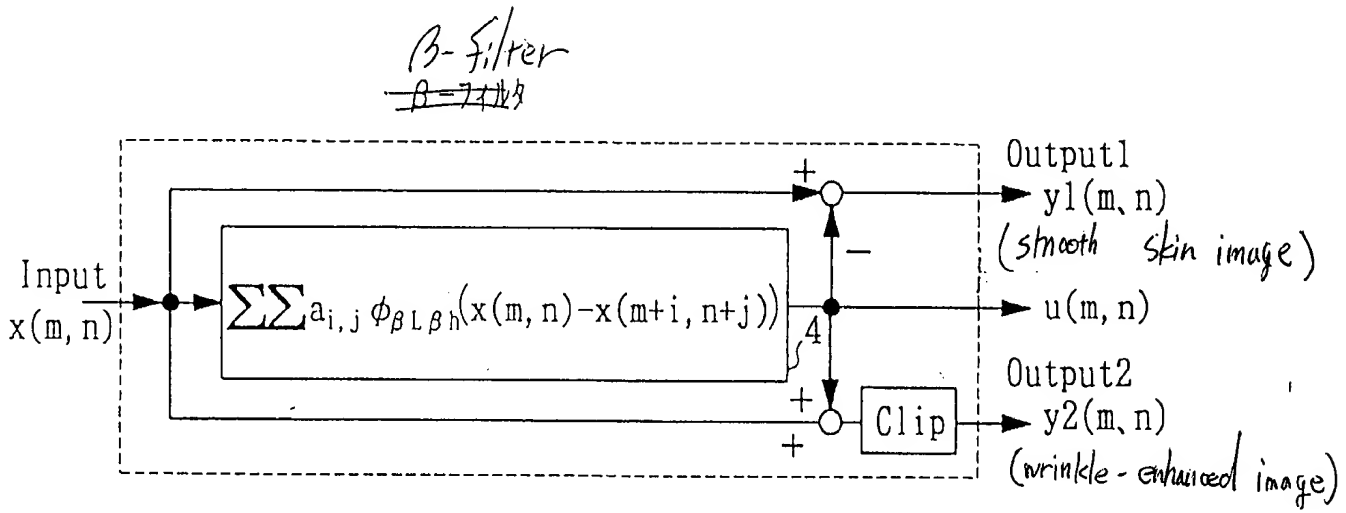

conversion instruction
Section
(smooth skin or wrinkle enhancement)
β-filter
2
Output
y(m, n)
(smooth skin image or wrinkle-enhanced image.)
Clip
+
-
Input
x(m, n)
$\sum\sum a_{i,j}\phi_{\beta L \beta h}(x(m,n)-x(m+i,n+j))$
u(m, n)
4

FIG. 11


β-filter
Input
x(m, n)
$\sum\sum a_{i,j}\,\phi_{\beta L \beta h}(x(m,n)-x(m+i,n+j))$
4
+
−
+
+
Clip
Output1
y1(m, n)
(smooth skin image)
u(m, n)
Output2
y2(m, n)
(wrinkle-enhanced image)

000201 sh026960

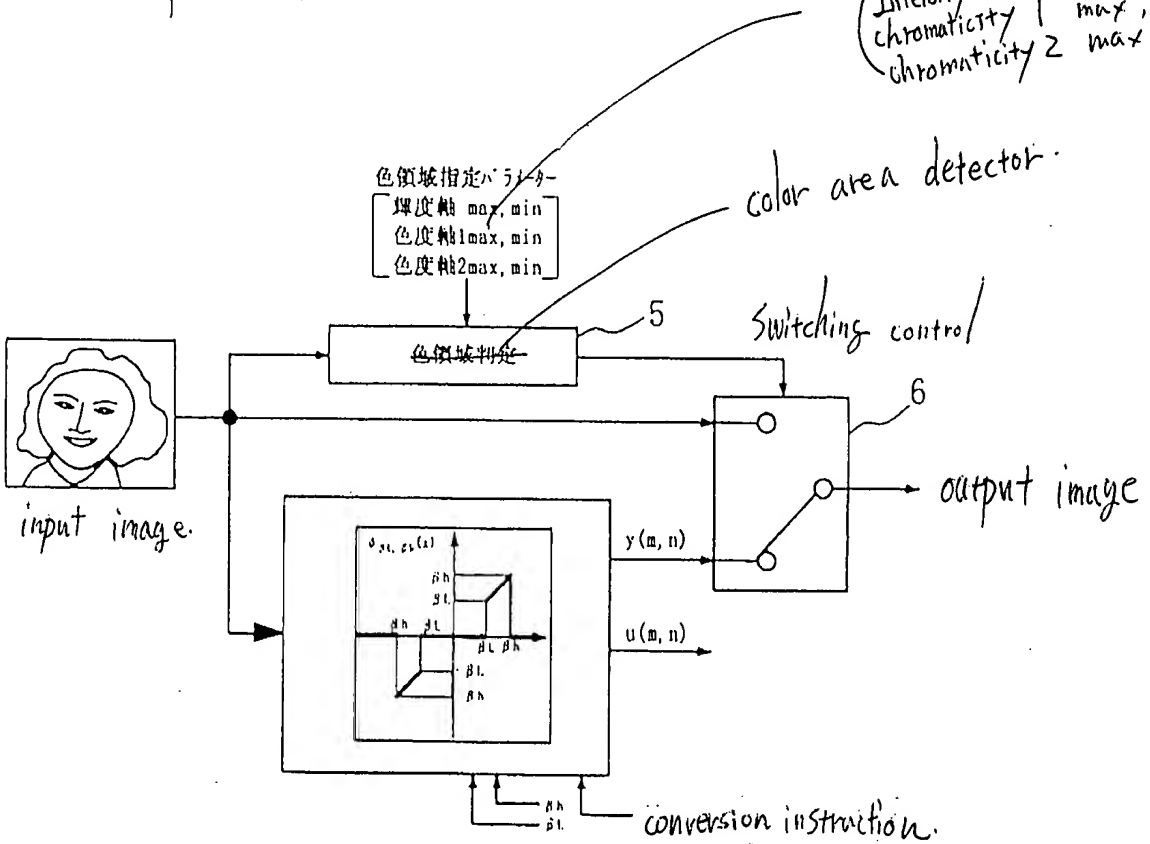



FIG. 12